COMMITMENT & INTEGRITY
DRIVE RESULTS

35 New England Business Ctr.
Suite 180
Andover, Massachusetts 01810
www.woodardcurran.com

T 866.702.6371
T 978.557.8150
F 978.557.7948

TECHNICAL MEMORANDUM

TO: Kimberly Tisa
FROM: Jeff Hamel and George Franklin
DATE: August 5, 2011
RE: Status Update - Tobin Hall PCB Remediation Analytical Results

---

This status update has been prepared to document the results of polychlorinated biphenyl (PCB) sampling completed to date in support of the Tobin Hall Concrete Decking PCB remediation project at the University of Massachusetts (UMass) Amherst Campus in Amherst, Massachusetts. Activities are being conducted in accordance with the PCB Remediation Plan submitted on July 20, 2011.

As previously discussed, the concrete decking required immediate removal to support the overall Commonwealth Honors College Residential Complex construction project. A remedial approach was developed for the removal and off-site disposal of the caulking and adjacent building materials to be encountered during this activity. This approach included the removal and off-site disposal of all caulking and the segregation of concrete scheduled for off-site disposal as either ≥ 50 ppm PCB waste or general construction debris. Concrete materials scheduled to remain in-place (Tobin Hall walls) are to be managed in-place through the application of a barrier encapsulant. The removal activities commenced on July 22, 2011 and are anticipated to be completed within the next two weeks. A summary of the samples collected and analytical results received to date for each of media is presented below.

Concrete Decking

As described in the July 20th submittal, the concrete decking materials are being segregated for disposal as either ≥ 50 ppm PCB waste or general construction debris. Based on the configuration of the concrete to concrete caulked joints, materials within twelve portions of the decking (approximately 20 foot by 20 foot sections) have been targeted for segregation as general construction debris.

A total of 48 characterization samples were collected at a frequency of one sample per 20 linear feet (l.f.) of caulked joints a distance of one foot from the caulked joints within each of the twelve areas designated for segregation. This sampling frequency corresponded to the collection of one sample from each of the four sides within all twelve of the areas. Results of the concrete decking characterization samples were summarized in the previous submittal and are presented on Table 1. A summary of analytical results is as follows:

- 40 samples reported PCB concentrations as non-detect (reporting limits of 0.10 ppm or less); and
- 8 samples reported PCB concentrations as < 1 ppm (PCB concentrations ranged from 0.14 to 0.85 ppm with an average concentration of 0.39 ppm).

Based on these analytical results, segregation of the decking materials is being performed through saw cutting along the joints at the segregation line. Portions of the concrete decking within the one foot cut line are being segregated for off-site disposal as ≥ 50 ppm PCB wastes. Remaining portions of the concrete (i.e., those designated for disposal as general construction debris) will remain in-place until underlying soils have been remediated as described below.

Underlying Soils

As described in the remedial plan, following removal of concrete materials designated as ≥ 50 ppm PCB wastes, soils to a depth of six inches are being excavated and managed with the removed concrete as a single waste stream (≥ 50 pm PCB wastes). Following excavation, 50 verification soil samples were specified to be collected based on a sample frequency of one sample per 20 l.f. of excavation. However, the initial sampling frequency implemented for the collection of verification soil samples was one sample per 10 l.f. of excavation. A total of 32 samples were collected at this initial sample frequency representing approximately one third of the total excavation area.

Analytical results were as follows:

- PCBs in 29 of 30 samples were reported as non-detect (19 samples) or < 1 ppm (10 samples with total PCBs ranging from 0.13 to 0.65 ppm);
- PCBs in one sample were reported at a concentration > 1 ppm (1.6 ppm). Based on this result, an additional six inches of soils were removed from this portion of the excavation to the next "clean (<1 ppm) point" in either direction and a verification sample was collected from an off-set location (results of this sample are currently pending);

Based on the overall data set, the verification sampling frequency going forward will be as specified in the July 2oth submittal (one sample per 20 l.f. of excavation). To date, results from eight samples collected at this sampling frequency have reported PCBs as non-detect (6 samples) or < 1 ppm (2 samples with reported concentrations of 0.24 and 0.51 ppm). Results of the verification soil sampling received to date are presented on Table 2.

Concrete Retaining Walls and Planting Beds

As described in the remedial plan, concrete retaining wall materials to a distance of one inch above and one inch below the caulked joints to a depth of two to three inches behind the joint were to be removed for off-site disposal as ≥ 50 ppm PCB wastes. Due to the overall project schedule, which limited the ability to collect additional samples following initial characterization, the extent of removal was increased to a distance of three inches above and below the caulked joints. Characterization samples of concrete were collected at a distance of three inches above and below the caulked joints along the concrete retaining walls and planting beds at a frequency of one sample per 20 l.f. of joint to delineate the extent of vertical migration from the caulked joint. To date, all 20 concrete samples have been collected from above the joint and 16 have been collected from below the joint (concrete samples below the joint are being collected following removal of the decking and underlying soils). A summary of analytical results is as follows:

- Above the Joint – PCBs were reported as non-detect in all 20 of the samples collected; and
- Below the Joint -
    - PCBs were reported in 10 of 11 samples as non-detect (1 sample) or ≤ 1 ppm (9 samples with PCB concentrations ranging from 0.16 to 0.98 ppm with an average concentration of 0.37 ppm); and
    - PCBs were reported in 1 sample at a concentration > 1 ppm (1.78 ppm). Based on this result, an additional characterization sample has been collected directly below this sample at a distance of 6 inches from the caulked joint. Analytical results from this sample will be used to determine the extent of required removal below the caulked joint to the next "clean" (< 1 ppm) sample point in either direction (i.e., over a 40 foot length of the retaining wall).

Results from the characterization samples still to be collected will be used to define the limits of required removal below the caulked joint as described above. Following removal of concrete surrounding the joint to a depth of three inches, verification concrete samples will be collected at a frequency of one sample per 20 l.f. of caulked joint from a point 3 inches directly behind the former caulked joints.

Concrete Walls of Tobin Hall

As described in the remedial plan, concrete walls of Tobin Hall scheduled to remain in place were to be encapsulated to a distance of one inch above and below the caulked joints. Due to the overall project schedule, which limited the ability to collect additional samples following initial characterization, the extent of encapsulation was increased to a distance of three inches above and below the caulked joint. Two characterization samples were collected at a distance of three inches above and below the caulked joint (total of four samples collected) to establish the required extent of liquid encapsulant to be applied to materials scheduled to remain in place. A summary of analytical results is as follows:

- 3 inches Above the Joint – PCBs were reported as non-detect in both of the samples collected; and
- 3 inches Below the Joint – PCBs were reported at a concentration of 0.41 ppm in one of the samples collected. Results from the second sample are currently pending.

Based on the results reported to date, a liquid coating (Sika 670W clear coating) will be applied to the concrete walls scheduled to remain in place to a minimum distance of three inches above and three inches below the caulked joint. The extent of application below the joint will be verified upon receipt of results from the final characterization sample collected.

Table 1
Summary of Concrete Decking Sample Results

Tobin Hall Decking Remediation Project
UMass Amherst
Amherst, Massachusetts

Sample ID	Distance from Joint (inches)	Sample Frequency	Sample Date	Total PCBs (ppm)
TH-CBC-013	12	1 per 20 l.f.	7/13/2011	0.41
TH-CBC-014	12	1 per 20 l.f.	7/13/2011	<0.10
TH-CBC-015	12	1 per 20 l.f.	7/13/2011	<0.10
TH-VBC-016	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-017	12	1 per 20 l.f.	7/15/2011	0.25
TH-VBC-018	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-021	12	1 per 20 l.f.	7/15/2011	<0.091
TH-VBC-022	12	1 per 20 l.f.	7/15/2011	<0.095
TH-VBC-023	12	1 per 20 l.f.	7/15/2011	< 0.087
TH-VBC-024	12	1 per 20 l.f.	7/15/2011	0.14
TH-VBC-025	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-026	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-027	12	1 per 20 l.f.	7/15/2011	< 0.087
TH-VBC-028	12	1 per 20 l.f.	7/15/2011	< 0.087
TH-VBC-029	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-030	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-031	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-032	12	1 per 20 l.f.	7/15/2011	0.14
TH-VBC-033	12	1 per 20 l.f.	7/15/2011	< 0.087
TH-VBC-034	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-035	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-036	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-037	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-038	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-041	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-042	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-043	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-044	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-045	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-046	12	1 per 20 l.f.	7/15/2011	< 0.087
TH-VBC-047	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-048	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-049	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-050	12	1 per 20 l.f.	7/15/2011	0.85

Table 1
Summary of Concrete Decking Sample Results

Tobin Hall Decking Remediation Project
UMass Amherst
Amherst, Massachusetts

Sample ID	Distance from Joint (inches)	Sample Frequency	Sample Date	Total PCBs (ppm)
TH-VBC-051	12	1 per 20 l.f.	7/15/2011	< 0.087
TH-VBC-052	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-053	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-054	12	1 per 20 l.f.	7/15/2011	0.51
TH-VBC-055	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-056	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-057	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-058	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-061	12	1 per 20 l.f.	7/15/2011	< 0.095
TH-VBC-062	12	1 per 20 l.f.	7/15/2011	0.229
TH-VBC-063	12	1 per 20 l.f.	7/15/2011	< 0.091
TH-VBC-064	12	1 per 20 l.f.	7/15/2011	0.63
TH-VBC-065	12	1 per 20 l.f.	7/15/2011	< 0.10
TH-VBC-066	12	1 per 20 l.f.	7/15/2011	< 0.095

Notes:
Samples collected in accordance with USEPA Region 1 Standard Operation Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (revised May 2011) from a depth of 0 to 0.5 inches.
Total PCBs reported as Aroclor 1254 or Aroclor 1248. No other Aroclors reported above the minimum laboratory reporting limit.

Table 2
Summary of Soil Verification Sample Results

Tobin Hall Decking Remediation Project
UMass Amherst
Amherst, Massachusetts

Sample ID	Depth Below Decking (inches)	Sample Frequency	Sample Date	Total PCBs (ppm)
TH-VBS-88	6-9	1 per 10 l.f.	7/26/2011	<0.099
TH-VBS-89	6-9	1 per 10 l.f.	7/26/2011	<0.10
TH-VBS-90	6-9	1 per 10 l.f.	7/26/2011	<0.10
TH-VBS-91	6-9	1 per 10 l.f.	7/26/2011	<0.11
TH-VBS-92	6-9	1 per 10 l.f.	7/26/2011	<0.11
TH-VBS-93	6-9	1 per 10 l.f.	7/26/2011	0.65
TH-VBS-94	6-9	1 per 10 l.f.	7/26/2011	<0.20
TH-VBS-95	6-9	1 per 10 l.f.	7/26/2011	<0.11
TH-VBS-96	6-9	1 per 10 l.f.	7/26/2011	<0.10
TH-VBS-97	6-9	1 per 10 l.f.	7/26/2011	0.35
TH-VBS-99	6-9	1 per 10 l.f.	7/27/2011	0.13
TH-VBS-100	6-9	1 per 10 l.f.	7/27/2011	<0.10
TH-VBS-101	6-9	1 per 10 l.f.	7/27/2011	<0.10
TH-VBS-102	6-9	1 per 10 l.f.	7/27/2011	<0.10
TH-VBS-103	6-9	1 per 10 l.f.	7/27/2011	0.41
TH-VBS-104	6-9	1 per 10 l.f.	7/27/2011	<0.11
TH-VBS-105	6-9	1 per 10 l.f.	7/28/2011	<0.10
TH-VBS-106	6-9	1 per 10 l.f.	7/28/2011	<0.11
TH-VBS-107	6-9	1 per 10 l.f.	7/28/2011	0.44
TH-VBS-108	6-9	1 per 10 l.f.	7/28/2011	<0.10
TH-VBS-110	6-9	1 per 10 l.f.	7/28/2011	0.14
TH-VBS-111	6-9	1 per 10 l.f.	7/28/2011	<0.10
TH-VBS-112	6-9	1 per 10 l.f.	7/28/2011	0.22
TH-VBS-113	6-9	1 per 10 l.f.	7/28/2011	0.57
TH-VBS-114	6-9	1 per 10 l.f.	7/28/2011	<0.10
TH-VBS-115	6-9	1 per 10 l.f.	7/28/2011	0.33
TH-VBS-116	6-9	1 per 10 l.f.	7/28/2011	0.19
TH-VBS-117	6-9	1 per 10 l.f.	7/28/2011	<0.10
TH-VBS-118	6-9	1 per 10 l.f.	7/28/2011	**1.6**
TH-VBS-121	6-9	1 per 10 l.f.	7/29/2011	<0.10
TH-VBS-123	6-9	1 per 20 l.f.	7/29/2011	<0.10
TH-VBS-124	6-9	1 per 20 l.f.	7/29/2011	0.24
TH-VBS-125	6-9	1 per 20 l.f.	7/29/2011	<0.10
TH-VBS-126	6-9	1 per 20 l.f.	7/29/2011	<0.10
TH-VBS-127	6-9	1 per 20 l.f.	7/29/2011	<0.11
TH-VBS-139	6-9	1 per 20 l.f.	7/29/2011	<0.10
TH-VBS-140	6-9	1 per 20 l.f.	7/29/2011	0.51
TH-VBS-141	6-9	1 per 20 l.f.	7/29/2011	<0.10

Notes:
Samples collected from a depth of 0 to 3 inches below ground surface following the excavation of 6 inches of soil from beneath the decking.
Total PCBs reported as Aroclor 1254 or Aroclor 1248. No other Aroclors reported above the minimum laboratory reporting limit.
Bold and shaded results indicate total PCBs reported at concentrations above the clean up level of ≤ 1 ppm.

Table 3
Summary of Retaining and Building Wall Sample Results

Tobin Hall Decking Remediation Project
UMass Amherst
Amherst, Massachusetts

Sample ID	Distance From Joint (inches)	Sample Date	Total PCBs (ppm)
Characterization Samples - Above the Joint			
TH-CBC-007	1	7/8/2011	< 0.10
TH-CBC-008	1	7/8/2011	< 0.091
TH-CBC-009	1	7/8/2001	< 0.095
TH-CBC-067	3	7/25/2011	<0.10
TH-CBC-068	3	7/25/2011	<0.091
TH-CBC-069	3	7/25/2011	<0.091
TH-CBC-070	3	7/25/2011	<0.091
TH-CBC-071	3	7/25/2011	<0.087
TH-CBC-072	3	7/26/2011	<0.095
TH-CBC-073	3	7/26/2011	<0.10
TH-CBC-074	3	7/26/2011	<0.087
TH-CBC-075	3	7/26/2011	<0.10
TH-CBC-076	3	7/26/2011	<0.091
TH-CBC-077	3	7/26/2011	<0.091
TH-CBC-078*	3	7/26/2011	<0.10
TH-CBC-081*	3	7/26/2011	<0.087
TH-CBC-082	3	7/26/2011	<0.10
TH-CBC-083	3	7/26/2011	<0.091
TH-CBC-084	3	7/26/2011	<0.091
TH-CBC-085	3	7/26/2011	<0.095
TH-CBC-086	3	7/26/2011	<0.095
TH-CBC-087	3	7/26/2011	<0.10
Characterization Samples - Below the Joint			
TH-CBC-119	3	7/28/2011	0.2
TH-CBC-120*	3	7/28/2011	0.41
TH-CBC-128	3	7/29/2011	0.98
TH-CBC-129	3	7/29/2011	0.23
TH-CBC-130	3	7/29/2011	<0.10
TH-CBC-131	3	7/29/2011	0.16
TH-CBC-132	3	7/29/2011	0.21
TH-CBC-133	3	7/29/2011	0.33
TH-CBC-134	3	7/29/2011	**1.78**
TH-CBC-135	3	7/29/2011	0.63
TH-CBC-136	3	7/29/2011	0.21
TH-CBC-137	3	7/29/2011	0.39
TH-CBC-142	3	8/1/2011	0.93
TH-CBC-143	3	8/1/2011	0.23
TH-CBC-144	3	8/1/2011	0.14
TH-CBC-145	3	8/1/2011	**1.31**
Verification Samples			
TH-VBC-010	3 - behind	7/8/2011	< 0.095
TH-VBC-011	3 - behind	7/8/2011	0.32
TH-VBC-012	3 - behind	7/8/2011	0.11
TH-VBC-146	3 - behind	8/1/2011	<0.095

Notes:
Samples collected in accordance with USEPA Region 1 Standard Operation Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (revised May 2011) from a depth of 0 to 0.5 inches.
Total PCBs reported as Aroclor 1254 or Aroclor 1248. No other Aroclors reported above the minimum laboratory reporting limit.
Bold and Shaded results indicate total PCBs reported at concentrations above the clean up level of ≤ 1 ppm.
* = Samples collected from Tobin Hall Building wall scheduled to remain in place.